

CENTRE HIGHLIGHTS OF THE YEAR

In the second year of the Centre, activities were up and running at full throttle – both with respect to scientific meetings, recruitment of staff and the implementation of new projects. Overall, the year has been highly productive.

ACTIVITIES In May, the Centre hosted its first annual site visit from the Danish National Research Foundation, including a tour of the lab and talks by Centre Principal Investigators (PIs), Postdoctoral Research Assistants (PDRAs) and PhD-students. In August, the Centre held its annual retreat at Kysthusene in Gilleleje, with talks by PhD students, PDRAs and Centre PIs. Head-of-Centre **Kenn Gerdes (KG)** gave a Keynote Lecture at the International Plasmid Biology Conference, Cambridge, UK and a presentation at the Royal Society in London, UK. The other Centre PI's participated in a number of meetings and conferences throughout Europe, Asia and USA as invited speakers. **Sine Lo Svenningsen (SLS)** organized the “Merit, Metrics and Research Management & Gender Bias: A Symposium on Women in Science” held at the Faculty of Science, with 250 participants. **SLS** also participated in establishing the Danish RNA Society. The fall and winter were very busy with teaching at all levels. **KG** initiated a new, article-based course (15 ECTS).

RESEARCH The Centre PIs published 42 papers in 2016 on topics related to the Centre, 11 of which were Open Access. *BASP* published in high-ranking journals, such as *Nature*, *Science*, and *Molecular Cell*. Further, the Centre produced 39 conference proceedings. One of **KG**'s PDRAs received a Long Term Fellowship from EMBO, while another received a Marie Skłodowska-Curie Individual Fellowship. The Centre generated a number of breakthroughs, two of which are illustrated below.

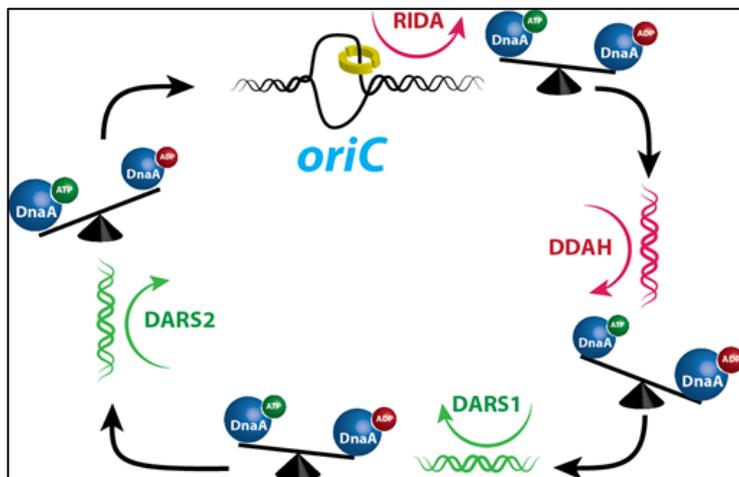


Figure 1. Chromosome Replication Cycle (ALO).

Dynamic balance between ATP-bound (active) and ADP-bound DnaA (inactive). Immediately after initiation, RIDA and DDAH tip the balance towards DnaA-ADP, preventing additional replication rounds. At later cell cycle stages, duplication of the DARS1 and DARS2 regions accelerate the rejuvenation of DnaA-ADP to DnaA-ATP. When a critical threshold of the DnaA-ATP/DnaA-ADP ratio is reached, initiation of a new round of replication is triggered. Controlled evolution experiments revealed that the chromosomal locations of DARS-sites are important for function, consistent with their evolutionary conservation.

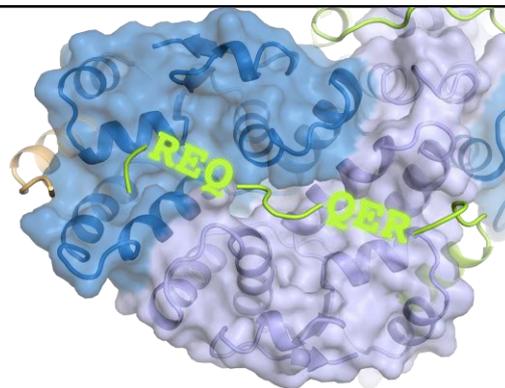


Figure 2. Protein Palindromes (DEB).

Several crystal structures of the VapBC toxin-antitoxin (TA) complex were solved. The structures revealed that the antitoxins recognize and neutralize their partner toxin molecules using a hitherto unknown palindromic "code" sequence illustrated above (REQ-QER). Moreover, structures of VapBC bound to DNA revealed the subtle changes that take place upon DNA binding, thereby explaining positive cooperativity at the molecular level for the first time.

EDUCATION AND OUTREACH The Centre produced a total of 8 master students and 20 bachelor students as well as participated in teaching in a long list of courses at the Faculty of Science and one online PhD course. The Centre continued to be present in the press (**KG** was interviewed by the New York Times and videnskab.dk; **DEB** was featured in Kristeligt Dagblad) and on the university websites.